Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of:	)	
	)	
Digital Audio Broadcasting Systems	)	MM Docket No. 99-325
And Their Impact on the Terrestrial	)	
Radio Broadcast Service	)	

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Reply Comments of Barry D. McLarnon

I am independent consultant and professional engineer, filing these reply comments as an individual.

NRSC-5 Does Not Meet the Requirements of an Open Broadcast Standard

Many of the recent comments in this proceeding have dealt with the question of whether NRSC-5 meets the necessary criteria to be considered a suitable standard for radio broadcasting. The comments from the NAB[1] make much of the fact that the NRSC DAB Subcommittee adopted NRSC-5 as a standard without a single "no" vote being cast. They neglect to mention, however, that a sizeable number of the subcommittee members (seven) felt that NRSC-5 was incomplete and should not be committed to a vote at that time. These members were persuaded to abstain rather than cast a negative vote; however, several of them have displayed the courage of their convictions and have now come forward to cast a "no" vote in this proceeding. In particular, Mr. Jonathon Hardis has made a compelling case[2] for rejecting NRSC-5 until such time as iBiquity fulfils its obligation to provide an

[1] Comments of the National Association of Broadcasters, filed July 18, 2005.
[2] Comments of Jonathan E. Hardis, filed July 14, 2005.

open standard for IBOC. I wholeheartedly agree with this position; however, even if this matter is resolved in some satisfactory fashion, there remain serious problems with the implementation of NRSC-5.

Adoption of NRSC-5 Would Thwart Spectrum Planning for All-Digital Operations

In its 2002 Report and Order, the Commission declined to endorse the iBiquity all-digital AM and FM IBOC systems, stating that "it would be premature to endorse systems that have not been subject to comprehensive and impartial testing. Moreover, adoption of an all-digital standard requires the consideration of novel and more complex technical and policy issues that arise only when the constraints of 'designing around' the legacy analog transmission standard are eliminated". [3] This is exactly right. Take, for example, the iBiquity all-digital system for the AM band. This system has a nominal bandwidth of 20 kHz and was designed for groundwave service only. Not only does it not support skywave service, but it appears that it would perform badly in situations where a station's nighttime groundwave coverage is subject to self-interference from skywave. Are these the correct design decisions for the future use of the AM band? In this brave new digital era, do we really want to write off the unique capability of this band to provide wide area coverage extension at night for selected stations? And do we really want to continue to suffer coverage restrictions due to first adjacent channel skywave interference by transmitting a 20 kHz bandwidth emission, when advances in audio codec technology would permit adequate quality to be achieved with a nominal bandwidth of only 10 kHz? And do we not want to seize the opportunity to finally deal with the nagging problem of skywave self-

[3] *First Report and Order in the Matter of Digital Audio Broadcasting Systems and Their Impact on the Terrestrial Radio Broadcast Service,* October 10, 2002, at 37.

interference? These are clearly matters that require *much* more study and consideration before the fateful step is taken to adopt an all-digital standard.

But here is the problem: if the Commission adopts the hybrid IBOC systems specified in NRSC-5, then the die is already cast. Receivers designed to work with the hybrid systems will work only with the all-digital systems specified in NRSC-5, and none other. If and when we reach a point of critical mass where the market penetration of digital receivers permits stations to begin transitioning to all-digital operation, then there is really no choice but to use the all-digital systems that were specified in NRSC-5 when that standard was first adopted. Otherwise, existing receivers will no longer function after the transition. The conclusion should be clear: NRSC-5 cannot be adopted, in whole or in part, until the requisite studies of the policy and technical issues referred to above have taken place.

Nighttime AM IBOC Requires Further Study, Not Blanket Authorization

In the 2002 Report and Order, the Commission stated as a policy goal, "we favor the rapid implementation of DAB in a manner that will not disrupt existing service".[4] Although it was recognized that this goal was unattainable in absolute terms, the tradeoffs involved were considered to be acceptable. With regard to the AM system, it was put this way: "the potential benefits of digital AM IBOC far outweigh the small possible increase in interference"[5]. In my previous comments[6], I provided some analysis showing how the interference from the AM hybrid system can in no sense be considered "small". If this is not sufficently convincing, I refer you to the other commenters who have provided real

[4] *Id.* at 7.
[5] *Id.* at 24.
[6] Comments of Barry D. McLarnon, filed July 14, 2005.

world examples of the interference. Considering the relatively small number of AM stations actually using IBOC to date, and the daytime nature of the emissions thus far, these reports are merely the tip of the iceberg. Most of these reports concern IBOC interference from second, and sometimes third, adjacent channel stations, which are the major source of daytime problems. At night, skywave IBOC interference from first adjacent stations will be the additional problem that is far from "small".

It should be clear, even in these early days of deployment of the AM hybrid system, that the interference problems were understated by iBiquity and the NRSC, and the tradeoffs are not as promised. This being the case, the Commission should not grant the blanket authorization for nighttime operation of this system that is being requested by iBiquity and its supporters. It is equally clear, however, that the full extent of the nighttime interference problem will not be appreciated by all concerned until nighttime tests have been conducted by a sufficient number of stations. It is therefore suggested that full time AM IBOC operation be authorized for a limited period of time. This test period should be well publicized, and all stations should be encouraged to take this opportunity to assess the impact, if any, of adjacent channel IBOC signals on their coverage. All stations transmitting IBOC should be required to maintain a log of their digital transmission periods and power levels so that they can be correlated with interference reports. Alternating several periods of IBOC and non-IBOC nighttime operation may facilitate the comparison. An attempt should also be made to alert the general public that these tests are taking place.

After these tests have been conducted, the Commission could open a comment window and study the results, with a view towards determining what changes in usage of the AM band would really serve the public interest. Of course, no nighttime IBOC

operations should take place without the prior approval of the other countries who are signatory to the international agreements dealing with AM broadcasting in the Americas, and these countries should be encouraged to take part in the evaluation of the system and subsequent studies.

Respectfully submitted,

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